

From: [Crossland, Ronnie](#)
To: [Webster, Susan](#); [Loesel, Matthew](#); [Smith, Monica](#); [Petersen, Chris](#)
Subject: FW: Air quality this evening
Date: Sunday, December 16, 2018 8:34:56 PM
Attachments: [BellaVista-PM.PDF](#)

From: Hagler, Gayle
Sent: Sunday, December 16, 2018 8:30 PM
To: Cascio, Wayne <Cascio.Wayne@epa.gov>; Gray, David <gray.david@epa.gov>
Cc: Sonich-Mullin, Cynthia <Sonich-Mullin.Cynthia@epa.gov>; Robbins, Chris <Robbins.Chris@epa.gov>; Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Edlund, Carl <edlund.carl@epa.gov>
Subject: RE: Air quality this evening

Dear David and all,

Here is my quick assessment of the situation. I looked into the monitoring data as well as information I could retrieve quickly about regional fires detected by satellites.

- There appear to be 4 Purple Air sensors in the area of Bella Vista, AR. These are \$200-300 monitors that can be purchased online and report data at an 80 second interval. You can buy one of these monitors, locate it in an area of interest, plug it in, and you have data reporting online and publicly (if you wish) very quickly. A few additional points:
 - These are not true PM2.5 mass readings – the sensors look at how the particles interact with light (optical detection) and then apply a number of assumptions to convert to a mass concentration.
 - We know that the monitor typically correlates well with reference monitors, however typically reports high in the United States. During biomass smoke events, we have seen the sensor track well but reporting concentrations double (or higher) than a nearby higher grade monitor.
- My personal quick take on this specific situation:
 - Of the four Purple Air monitors, even without any correction for potential overprediction, the PM2.5 level over a 24 hour average Air Quality Index for PM2.5 would be Moderate.
 - One monitor – titled “Trafalgar Fire NW”, does appear to have the most dynamic concentrations (including brief periods at “Hazardous” levels) which indicate some type of emissions hitting the monitor, however, still the longer-term average we use for health messaging is at the Moderate level. If you were to assume the monitor overpredicts like it does elsewhere, the 24 hour AQI may be in the Good category.
 - The nearest official air quality monitoring station, in the Springdale area, has “Good” as the longer-running air quality condition over the past 24 hours.
- To understand the cause of the dynamic concentrations, you would want to start off with talking to the owner of the Purple Air sensors and understand how they are located. This monitor could be affected by very local emissions, such as a backyard grill, fire pit, leaf pile

burning, etc., and it would be good to start with understanding if there was anything very local occurring during those high events.

- I did look into a fire detection and smoke transport model (BlueSky) – there are some fire detects in Missouri with smoke transporting southward, however the estimated concentration increases are quite low (a few micrograms per cubic meter).

I would be happy to assist further, if there are any questions about the technology or if any of my assumptions about the location or timeframes of concern were incorrect. Attached are a few images I pulled that informed my assessment above.

Best,
Gayle

Gayle Hagler, Ph.D.
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Durham, NC 27703

From: Cascio, Wayne
Sent: Sunday, December 16, 2018 7:36 PM
To: Gray, David <gray.david@epa.gov>
Cc: Sonich-Mullin, Cynthia <Sonich-Mullin.Cynthia@epa.gov>; Robbins, Chris <Robbins.Chris@epa.gov>; Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Edlund, Carl <edlund.carl@epa.gov>; Hagler, Gayle <Hagler.Gayle@epa.gov>
Subject: Re: Air quality this evening

David - The most experienced person in ORD with whom I am aware with extensive experience with Purple Air monitors in association with biomass burning is Gayle Hagler in NERL. I'm copying her here. Wayne

Sent from my iPhone

On Dec 16, 2018, at 6:36 PM, Gray, David <gray.david@epa.gov> wrote:

Thanks

Sent from my iPhone

On Dec 16, 2018, at 5:31 PM, Sonich-Mullin, Cynthia <Sonich-Mullin.Cynthia@epa.gov> wrote:

David,

I looked into this earlier today. I found a PowerPoint presentation on the results of a comparison of the PurpleAir monitors to two Federal Equivalent Method (FEM) instruments. I am including the link to it here: <http://www.aqmd.gov/docs/default-source/aq-spec/field-evaluations/purpleair---field-evaluation.pdf>

The comparison was done by the South Coast Air Quality Management District in California. FEM instruments and PurpleAir sensors were compared for both PM2.5 and PM10. The results indicate data from the PurpleAir PM sensors were reasonably correlated to the FEM instruments. See the discussion on Slide 18.

I do not know the details of this comparison but found this information interesting.

I also forwarded your request to some of our monitoring experts and will let you know if they can provide additional information regarding these sensors.

I hope this helps.
Cindy

Cynthia Sonich-Mullin
Director, National Risk Management Research Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
26 W. Martin Luther King Jr. Dr.
[Cincinnati, Ohio 45268](#)
Phone: [513-569-7923](tel:513-569-7923)
Mobile: [513-560-5043](tel:513-560-5043)

Sent from my iPhone

On Dec 16, 2018, at 6:05 PM, Gray, David <gray.david@epa.gov> wrote:

ORD friends - any experience with the monitors sold by
Purple Air?
David

Sent from my iPhone

Begin forwarded message:

From: "Keogh, Becky"
<keogh@adeq.state.ar.us>
Date: December 16, 2018 at 4:51:55 PM CST
To: "Gray, David" <gray.david@epa.gov>
Cc: "Spencer, Stuart"
<SPENCER@adeq.state.ar.us>
Subject: Re: Air quality this evening

David

I appreciate the information and the attention
given to this concerning news. Do you have
any information on the accuracy of the these
monitors?

Sent from Becky W Keogh

On Dec 16, 2018, at 8:12 AM, Gray, David
<gray.david@epa.gov> wrote:

Mayor,

Good morning. This appears to be
a citizen air monitor of which
from the web page - It looks like
there are now 3 in the area. This
is not an EPA monitor and the
naming must be confusing to the
community. This reading is much
higher than EPA results during our
3-day sampling and may indicate a
new fire close to that location.
Smoke particulates at these levels
should be very visible. I presume
that the local Fire Chief is looking
into that potential and will inform
the community if fire precautions

are needed.

ADEQ and ADH may have other observations and are copied.

David

Sent from my iPhone

On Dec 16, 2018, at 7:35 AM,
Gray, David
<gray.david@epa.gov> wrote:

Mayor,

I am sharing your
email with ADEQ and
ADH for their
awareness.

David

Sent from my iPhone

On Dec 16, 2018, at
5:45 AM, Peter
Christie
<pchristie@bellavistaar.gov>
wrote:

Very
alarming!!
I have
forwarded
the
info to
the
EPA.

Peter
Christie,
Mayor
Bella
Vista,
AR

From:

Peter
Christie

Sent:

Sunday,
December
16,
2018
5:44:08
AM

To:

Gray,
David

Subject:

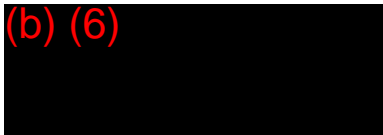
Fwd:
Air
quality
this
evening

Some
residents
are
evacuating.

Peter
Christie,
Mayor
Bella
Vista,
AR

From:

(b) (6)

A large black rectangular redaction box covers the majority of the email content in this block, starting below the 'From:' header and extending to the right and down.**Sent:**

Saturday,
December
15,
2018
10:58:12
PM

To:

Peter

Christie

Subject:

Air
quality
this
evening

Several
people,
including
me had
to
evacuate
their
homes
tonight.
We
have to
fix this!
It's
beyond
comprehension.